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DEPARTMENTS.

SOLUTIONS OF PROBLEMS.

ARITHMETIC.

169. Proposed F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

At what rate per cent. must a note be discounted at the end of a quarter of a year in order to produce a discount equivalent to 10% interest for the year?

No solution received.

170. Proposed by J. F. LAWRENCE, A. B., Breckenridge, Mo.

Suppose the market value of 5% bank stock to be 11 1-9% higher than 8% corporation bonds; I realize 8% on my investment, and my income from each is \$180. What did I invest in each?

Solution by G. B. M. ZERR, A. M., Ph. D., Parsons, West Va.

$11\frac{1}{9}\% = \frac{10}{9}\%$. $\therefore$ The 5% stock costs $\frac{10}{9}$ as much per share as the 8% stock.

$\therefore \frac{\text{Investment in 5\% stock}}{\frac{10}{9}} \times \frac{5}{100} = \text{Investment in 8\% stock} \div \frac{8}{100}$.

$\therefore \text{Investment in 5\% stock} : \text{Investment in 8\% stock} = 16 : 9$.

Total investment = $\$360 \div .08 = \$4500$.

Investment in 5% stock = $\frac{16}{25}$ of $\$4500 = \$2880$.

Investment in 8% stock = $\frac{9}{25}$ of $\$4500 = \$1620$.

Also solved by H. B. LEONARD, B. S., and G. W. GREENWOOD, B. A.

171. Proposed by JOHN S. ROYER, Editor of The School Visitor, Columbus, Ohio.

A drawer made of inch boards is 8 inches wide, 6 inches deep, and slides horizontally. How far must it be drawn out to put into it a book 4 inches thick, 6 inches wide, and 9 inches long?

Solution by G. B. M. ZERR, A. M., Ph. D., Parsons, W. Va., and H. B. LEONARD, B. S.

Let a = length of book, b = its thickness, c = depth of drawer, x = distance it must be drawn out. If we draw out the drawer just far enough to put in the book lengthwise we have from the figure properly drawn, $a : x = c : b$ or $9 : x = 5 : 4$. Therefore $x = 7\frac{1}{5}$ inches.

ALGEBRA.

183. Proposed by W. J. GREENSTREET, M. A., Editor of The Mathematical Gazette, Stroud, England.

Find the condition that $x : y : z$ may be real, given that $\Sigma ax^2 = \Sigma aax = 0$ and $\Sigma aa^2 = 1$.